Opinions of Science Teachers in Primary Schools Related to Science and Technology Program

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SYNOPSIS

INTRODUCTION

Primary education curriculum was amended by Ministry of National Education in 2004-2005 education year by changing the name of the science lesson as “science and technology”; after implemented in the first level of 120 pilot schools in 9 provinces in the same year, this new primary education curriculum was officially started to be implemented in the first level of all schools in 2005-2006 education year. The pilot implementation of the curriculum was carried out in the sixth grade of the second level of primary schools in the same year and then the program was officially put into practice in the sixth grades of the second level of primary schools in 2006-2007 education year.

For an education program to be successful, it is extremely important that teachers who are the practitioners of the program and supervisors and managers who are responsible for supervising and leading the applications of the program have the knowledge, skills, attitudes and values required by the elements and implementation principles of the program. For this reason, in-service training programs are organized in the process of program development in order to provide teachers, supervisors and managers with the qualities prospected for the new program (Education Programs and Education Field Board of Professors, EPÖAPK, 2006). Ercan and Altun (2005) have stated in their study that in-service trainings provided to teachers are mostly theoretical and have restricted implementation area; similarly, Yaşar et al. (2005) have argued that the inadequacy of the in-service training is a limitation in terms of the new primary education programs.

In another study carried out regarding the new primary education programs, it has been expressed that alternative evaluation and measurement approaches based on constructivist learning theory have been targeted to be used, however, necessary explanations about the “diagnostic branched tree” or “science diaries” –methods which have been recommended to be applied- have not been made and teachers have been left without sufficient explanation in this topic (Report on Examining and Evaluating New
Education Programs, 2006). In another study in which primary education programs have been evaluated in terms of teacher adequacies, it has been determined that the field in which teachers have found themselves as the least adequate is measurement and evaluation (Gözütok et al., 2005).

The vision of 2004 Science and Technology Program is to equip all students with science and technology literacy whatever their personal differences are (Ministry of National Education, 2004). However, when some problems stemming from these programs (implementation level, content structure) are experienced, the difficulty of equipping students with science and technology literacy arises (Hobson, 2001). Because of this fact, teachers who are practitioners of the programs play very important roles in the success of the program. In addition to adoption of philosophical bases of the program, teachers should be adequately equipped in terms of the dimensions such as method, technique, measurement and evaluation, required by the program (Akpınar, 2002).

As can be understood from the points of views of teachers, it is clear that some problems are experienced in implementation phase. The most important of these problems is the insufficient number of material and equipment, which is strongly felt. Teachers demand the provision of the materials mentioned in the program to schools or allocation of the budget required for purchasing related equipment for schools. Apart from that, it has been determined that teachers claiming they were not informed adequately about the program could not understand the program based on the science-technology-society approach and could not distinguish purposes. The fact that it is worrying these teachers do not have time to eliminate their deficiencies can also be taken into consideration. However, with the seminars or in-service trainings to be implemented at the demanded quality and systematically, these problems can only be solved to a certain extent (Dindar and Yangın, 2007).

Studies mentioned above are the ones which are elaborated on the positive or negative aspects of the program and on the problems to arise during and after the implementation of new primary education programs in the first level of primary education.

**PURPOSE OF THE STUDY**

This study aims at evaluating the science teachers’ program related ideas and thoughts which they have formed through the in-service training courses they participated just before the application of Science and Technology Program in the second level of primary schools as well as their ideas and thoughts developed after the implementation of the program. To this end, answers for the following questions have been sought:

1. What were Science teachers’ opinions regarding the Science and Technology Program before the in-service training course?
2. What are Science teachers’ opinions regarding the Science and Technology Program after the in-service training course?
3. What are Science teachers’ opinions after they have applied the Science and Technology Program?

**METHODOLOGY**

This is a qualitative study conducted with the groups formed naturally and can be defined as a case study. In order to introduce the Science and Technology Program which started to be applied in the second level of all primary education schools in 2006-2007 educational year, Directorate of National Education of Kocaeli arranged an in-service training program under the title of “Introduction of Science and Technology Curriculum of the 6th, 7th and 8th Grades of Primary Education” in cooperation with Faculty of Education,
Kocaeli University in the summer season of 2006. The researcher himself took part in this in-service training and tried to introduce the Science and Technology Program in three-day trainings to a total of 150 science teachers in 3 different districts of Kocaeli Province (Izmit, Gebze, Gölcük and surrounding of these districts). This study was carried out with 89 teachers to have taken part in the course on the first day, wished to participate voluntarily in this study and participated in the whole three-day program.

At the beginning of the in-service training course, in order to learn the teachers’ ideas and points of views they developed to date regarding the Science and Technology program, the first data collection instrument composed of 3 open-ended questions was distributed and teachers were requested to answer this instrument. At the end of the course, in order to learn the ideas regarding the program developed by in-service training, teachers to have participated in the course were asked to answer five open-ended questions in the second data instrument. That at the beginning of the course there was not enough time and opportunity to interview with teachers and that the course in each district started when the course in another district ended made it necessary to ask teachers express their points of views in writing. In the preparatory stage of the data collection instruments, the scope of the questions was developed by using the literature, the book of Science and Technology Program and the interviews made about the new program with five science teachers employed in 3 different pilot schools. The prepared questions were examined in terms of clarity, comprehensibility and coverage of the study subject firstly by two experts from the field of education and educational sciences, secondly by a language expert before it was finalized.

Teachers participating in the semi-structured interviews were selected by simple random sampling method among the teachers in three districts, who took part in the in-service training course in the first part of the study, and whose names and schools were listed by the researcher himself. A total of 30 teachers, 10 of whom would be from each district, to have participated in the interviews were given information about the purpose of the study and they were given the guarantee that their identities would be kept confidential. They were asked whether they accepted to participate in the interview voluntarily or not, and the day and time of the interview was determined for each separately. A different inventory form was used for each teacher and what they said was recorded.

Data collection instruments composed of open-ended questions and answered by teachers in writing and the inventory forms used during the interviews in the study were examined separately and similar answers of each question were collected. After that, all different answers written under the open-ended questions of data collection instruments and the questions asked during the interviews were written as options and two different coding keys were developed (Data collection instrument coding key and interview coding key). In order to determine the reliability of the coding key, 5 items from the data collecting instruments composed of the open-ended questions answered by 89 teachers and 5 items from the inventory forms filled in during the interviews made with 30 teachers were randomly selected; they were handed to two researches with coding keys to be read and examined. Issues of ‘consensus’ and ‘dissensus’ between the researcher and the other two researchers were determined. Reliability formula suggested by Miles and Huberman (1994) was used and correspondence percentage accepted as the study reliability was calculated as 94% on average for the questions in the data collection instruments and 93% on average for the questions in the interviews.

**FINDINGS and DISCUSSION**

General points of views and opinions of science teachers regarding the program which have been developed on the basis of the in-service training program they attended
just before the application of Science and Technology Lesson Program in the second level of the primary schools and, general points of views and opinions of science teachers developed one year later when they implemented the program have been examined and the obtained findings have been tried to be compared with the literature.

It has been determined that 89.9% of science teachers are of the opinion that this in-service training course has generally constituted a point of view regarding Science and Technology Program. In addition, it has been found out that some teachers agree a longer and more practice-oriented time should be allocated. The study of Erçan and Altun (2005) lists teachers’ points of views about the fact that the duration of in-service training prepared to introduce the program is inadequate and its content is totally theoretical.

According to the data obtained through the questions answered by the science teachers at the beginning of the in-service training course, a large part of science teachers (91%) have been of the opinion that the change in Science program is necessary for science teaching and, it is pleasing that this is the indicator of the fact that they are in favor of change and will develop positive attitudes towards the new program. The leading reasons that they have expressed in relation with this is that the program is composed of very intensive information (23.6%) and is not student-centered (16.8%). Another pleasing aspect of the program is that these two subjects mentioned here as reasons have been included in the main issues constituting Science and Technology Program (Ministry of National Education, 2005). In Erdoğan’s (2005) study in which old and new science programs have been compared, it has been stated that teachers have thought that in the older program students sat, listened to the lesson and played a passive role and huge amount of memory-based information was given to students.

It is seen that a large number of the teachers have found alternative evaluation techniques important after in-service training and thought of implementing them. However, during the interviews one year after the implementation of the program, the most problematic issue experienced by science teachers related to the program has been identified as the evaluation. 83.3% of the teachers participating in the interviews have stated that they could implement only a small part of the alternative evaluation activities. Therefore, when the teachers were asked which evaluation activities they could not implement mostly, it has been determined that 93.3% of them have never been able to implement ‘structured grid’, ‘diagnostic branched tree’, ‘self and peer evaluation’. The most important problem experienced by teachers when implementing evaluation activities has been determined as the long time the activities take (66.6%). In Yapıç and Demirdelen’s (2007) study carried out with the first level primary education teachers, teachers’ points of views regarding the measurement and evaluation in new program have been examined and it has been determined that measurement and evaluation has taken much time of teachers (87%). In the study of Gözütok et al. (2005), it has been determined that the subject in which teachers have become most anxious has been measurement and evaluation in the in-service training seminars held with teachers.

Results such as that the program is student-centered (50.5%), it underlines learning via practice (46%), it is activity based and enables students like science lessons (44.9%), it directs students to making researches (35.9%) and it is composed of spiral units (33.7%) have been found to show similarity with the results of the studies carried out up to date in relation with many aspects of the new program which is generally accepted positive by teachers. In the study of Yapıç and Demirdelen (2007), it has been determined that 35 % of the teachers participating in the study has of the opinion that the new program stimulates students’ motivations for making researches, and 33 % have been of the opinion that it is directed to children, it is interesting and students enjoy implementing the activities. Erçan and Altun (2005) have determined in their study that 95% of teachers have
found the new program as student-centered and students have become more active with the new program when compared to previous years.

Negative aspects found in association with the program by science teachers such as that the schools do not have adequate equipment for this program, that it can not be implemented due to the lack of equipment and device, that teachers and students are not ready, that it is not in conformity with the content of examinations like OKS (Examination for Secondary Education) and that the activities take long time show similarity with the results of the studies in which first level teachers’ points of views regarding the program have been researched (Dindar and Yangını, 2007; Yapıç and Demirdelen, 2007; Erdoğan, 2005).

76% of science teachers have found the acquisitions related to the Science- Technology- Society- Environment, Scientific Process Skills and Attitudes and Values which are new learning fields put into the program as realizable acquisitions; however, in the interviews made one year after the new program has been put into practice, teachers expressed that they could realize these acquisitions though slowly (30%), it is difficult to realize all of them and it is proper to evaluate these acquisitions after all stages of the program are completed due to “spiral principle” (26.6%). Apart from this, it has respectively been determined that they have not attached importance to the realization of acquisitions out of subject field (20%), that it has been very difficult to realize these acquisitions and they do not believe that it only depends either on the program or school (16.6%), that they have believed in the fact that these acquisitions can be achieved by the students educated in this program since the first grade of primary education; however, they have thought that it will be difficult to realize this with the students who have started this program in the middle of their education life (16.6%). Kaptan (2005) explains in his study in which he has evaluated the Science and Technology Program that “learning areas” approach brought by the program and detailed presentation of the acquisitions related to these fields are the strong aspects of the program. In another study in which the importance degree and realization level of the acquisitions regarding the skills, understandings and values in the Science and Technology Program are examined, it has been determined that each one of the acquisitions related to the attitudes and values is the acquisition which can create long-term changes in students’ lives and affect not only their lives in school environment but also out of school; for this reason and in the context of the “Spiral principle” which is also in the core of the program, these acquisitions can only be realized completely not after a period of only one year but at the end of the 8th year when the program will be implemented and completed (Buluş-Kirikkaya and Tanriverdi, 2006).

RESULTS and SUGGESTIONS

1. It has been determined that science teachers have found the evaluation activities in the new program important after the in-service training and they have had difficulty in implementing these activities in their lessons although they have thought of implementing them and there have been evaluation activities that they even have not implemented ever.

2. It has been determined that both after the in-service training course and one year after the start of program implementation, teachers have had positive impressions about the new program as that it is student-centered, underlines the learning by practice, gives importance to experiment and observation, directs students to make researches, eases the subject levels and that it has spiral units and is based on activity enable students like science lessons.

3. It has been determined that teachers have seen the negativities related to the new program after the in-service training course as the negativities stemming not from the general program but from the limited opportunities as that the program can not be
implemented due to lack of equipment and device, increases teacher’s burden and can not be possible to implement due to high number of the students in a class, can only be benefited by the students exerting personal efforts, and that process evaluation will take long time.

4. It has been determined that although they have found the acquisitions under the title of Science-Technology-Society-Environment, Scientific Process Skills and Attitudes and Values as realizable, they have had difficulty in implementing them.

5. One year after the program has started to be implemented, the most striking evaluation of the teachers related to the program has been that the new program implemented has increased student achievement.

Although Ministry of National Education introduced or gave information about the program with an only three-day in-service training to the science teachers before putting the Primary Education Science and Technology Program into practice in the second level of primary schools in 2006-2007 education year, it is seen that teachers mostly have benefited from this course and tried to be successful as long as the physical conditions and opportunities enable. In accordance with the spirit of the program, the fact that teachers evaluate themselves and the program more objectively has been reflected to the interviews. As stated by teachers, what is needed to be done hereinafter is planning and effective implementation of the in-service trainings for reflecting and extending the innovations regarding the program implementation. The efficiency of these courses depends on the cooperation of Directorates of National Education with education faculties of universities.
REFERENCES


